

## REMARKS

As a preliminary matter, Applicant respectfully requests entry of this after-final amendment because the claim amendments do not require further search or consideration, but instead merely relate to correcting potential antecedent basis issues. More specifically, the preambles of independent Claims 1 and 6 have been amended to recite that the computer includes "a memory" to provide antecedent basis for the memory recited in the body of the claim. Since no new issues are raised by such claim amendments, Applicant respectfully requests entry and consideration of these claim amendments.

With regard to the Specification, the Examiner advised Applicant to incorporate the claimed "computer-readable storage medium" into the Specification. Accordingly, Applicant has amended page 3 of the Specification to include the "computer-readable storage medium." Applicant respectfully submits that such an amendment should not constitute new matter because the entirety of the disclosure as originally filed implies, to one of ordinary skill in the art, the use of some form of storage media for storing the computer program. More specifically, the present invention relates to a program to be implemented on a computer (*see e.g.*, Specification, page 1, lines 11-13; page 3, lines 10-17; page 4, lines 3-8 and 14-16; and page 42, lines 9-12). One of ordinary skill in the art knows that computer programs are ordinarily stored on some form of storage media, such as a computer-readable storage medium. Thus, the entire original disclosure implies the use of a computer-readable storage medium for storing the program.

Claims 1, 3-6 and 8-10 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Applicant respectfully traverses this rejection.

As mentioned above, Applicant has added the phrase "having a memory" to the preambles of independent Claims 1 and 6. Accordingly, Applicant respectfully submits that the recitation of the term "the memory" in the body of these two claims should be clear. Thus, Applicant respectfully requests the withdrawal of this §112, second paragraph rejection.

Claims 1, 3-6 and 8-10 stand rejected under 35 U.S.C. §101 as allegedly being directed to non-statutory subject matter. Applicant respectfully traverses this rejection.

In the rejection, the Examiner correctly asserts that claims will be considered as statutory if they "include a practical/physical application or a concrete, useful and tangible result" (emphasis added). However, then the Examiner incorrectly concluded that since the claims at issue fail to include a practical/physical application, they were non-statutory. The Examiner is reminded that "a physical transformation is not an invariable requirement, but merely one example of how a mathematical algorithm [or law of nature] may bring about a useful application" (bracketing in original, internal quotations and citation omitted). *See* MPEP §2106(IV)(C.2)(2). The Examiner failed to consider that the claims at issue could be statutory by meeting the second leg of the analysis (including a "concrete, useful and tangible result."). *See Id.*

In response, Applicant respectfully submits that the claims at issue are statutory because, *inter alia*, they meet the second of the two alternative legs of the analysis for showing statutory subject matter (*i.e.*, the claims include a "concrete, useful and tangible result"). More specifically, as discussed below, Applicant will show that the final result achieved by the claimed invention is a useful, tangible and concrete result, as discussed in MPEP §§2106(IV)(C.2)(2)(a)-(c).

First, Applicants respectfully submit that the claims at issue provide a useful result because the utility is specific, substantial and credible, as discussed in MPEP §§2107-2107.01. Applicant respectfully submits that one of ordinary skill in the art would clearly recognize the utility of invention of the present claims as providing a method in which the hardware of a shared-memory type scalar parallel computer is optimized in order to obtain the eigenvalue and eigenvector at a high speed. Such an asserted utility clearly meets the minimal requirements set forth in MPEP §2107(II)(1) which states that "If the applicant has asserted that the claimed invention is useful for any particular practical purpose (*i.e.*, it has a "specific and substantial utility") and the assertion would be considered credible by a person of ordinary skill in the art, do not impose a rejection based on lack of utility" (emphasis added).

Such utility is specific because it is narrowly directed to calculating eigenvalues and eigenvectors by the steps detailed in the claims. Moreover, the utility of calculating eigenvalues and eigenvectors in the particular claimed manner for parallel processing of a shared-memory type scalar parallel computer is specific to the claimed

subject matter of computer processing, and provides the public benefit of allowing the computer to operate at a higher speed, thereby reducing power consumption, reducing computing time and reducing waiting time. *See* MPEP §2107.01(I)(A) ("A specific utility is specific to the subject matter claimed . . . and can provide a well-defined and particular benefit to the public" (internal quotation marks omitted)).

The utility of the present is also substantial because it is not a throw-away or insubstantial utility, such as the example provided in MPEP §2107(II)(1)(i) of using the invention as landfill. Further, the invention is useful in its current form, as claimed and disclosed, for optimizing the process of calculating eigenvalues and eigenvectors, without the need for further research. *See* MPEP §2107.01(I)(B)("[A]n application must show that an invention is useful to the public as disclosed in its current form, not that it may prove useful at some future date after further research. Simply put, to satisfy the 'substantial' utility requirement, an asserted use must show that the claimed invention has a significant and presently available benefit to the public. . . . Thus, a "substantial utility" defines a "real world" use. Utilities that require or constitute carrying out further research to identify or reasonably confirm a "real world" context of use are not substantial utilities.").

Additionally, with regard to credibility of the asserted utility, the specific disclosure of examples of how to go about calculating eigenvalues and eigenvectors in the present Specification surely shows the credibility of the asserted utility to one of ordinary skill in the art. Thus, as demonstrated above, the requirements set forth in MPEP §2107 for

utility are relatively minimal, and such requirements are clearly met and exceeded by the present invention.

Second, Applicant respectfully submits that the claimed invention produces a tangible result because the claimed result of calculating the eigenvalues and eigenvectors, which includes the step of copying various data into a memory, is a real world result which meets the guidelines of MPEP §2106(IV)(C.2)(2)(b), which states that the claim "must set forth a practical application . . . to produce a real world result." As further guidance, MPEP §2106(IV)(C.2)(2)(b) states that "The tangible requirement does not necessarily mean that a claim must either be tied to a particular machine or apparatus or must operate to change articles or materials to a different state or thing." However, the claimed invention *is* actually tied to a particular type of apparatus (a shared- memory type scalar parallel computer), which strengthens Applicant's argument that the claimed invention meets the tangibility requirement, and that the claimed invention is not merely an abstract process with no practical application. Thus, Applicant respectfully submits that the practical application of storing data and improving parallel processing in a shared-memory type scalar parallel computer, including the calculation of eigenvalues and eigenvectors, is a tangible real-world result.

Third, with regard to the "concrete result" requirement, Applicant respectfully submits that this requirement is also met because the result is substantially repeatable. *See* MPEP §2106(IV)(C.2)(2)(c)("the process must have a result that is substantially repeatable" and the "opposite of "concrete" is unrepeatable or unpredictable."). In the present invention,

when the same claimed steps are followed, the same result will be obtained. Thus, the "concrete" requirement is also met.

Finally, the claimed invention does not preempt all methods of obtaining the eigenvalues and eigenvectors. Instead, the claims define specific steps, such as, dividing a matrix into blocks, copying the blocks to memory, tri-diagonalizing the blocks with a specific process, calculating the eigenvalue and eigenvector, and converting the calculated eigenvector to transform it into parallel calculation of matrices with a prescribed block width and calculating the eigenvector of the original matrix. Thus, other methods of obtaining eigenvalues and eigenvectors not including these specific steps are not preempted by the current claims.

Accordingly, for at least the reasons stated above, Applicant respectfully requests the withdrawal of this §101 rejection of Claims 1, 3-6 and 8-10.

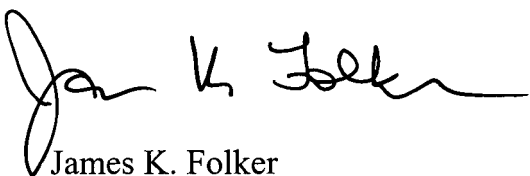
Additionally, with regard to Claims 1 and 3-5, Applicant also respectfully submits that the §101 rejection should be withdrawn because these claims include functional descriptive material (a computer program which imparts functionality when employed as a computer component) recorded on a computer-readable medium. *See* MPEP §2106.01("When functional descriptive material is recorded on some computer-readable medium, it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since the use of technology permits the function of the descriptive material to be realized."); MPEP §2106.01(I)("a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional

interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory.").

For all of the above reasons, Applicant requests reconsideration and allowance of the claimed invention. Should the Examiner be of the opinion that a telephone conference would aid in the prosecution of the application, or that outstanding issues exist, the Examiner is invited to contact the undersigned attorney.

Respectfully submitted,

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